

CLAIM AMENDMENTS:

1-11 cancelled

12. (currently amended) A method for calibrating a camera-laser-unit with respect to at least one calibration-object disposed at a given position and orientation in three-dimensional space, the camera-laser-unit having at least one laser and at least one camera, wherein the laser and the camera are disposed at a given distance with respect to one another, and an optical axis of the laser and an optical axis of the camera subtend a given angle (α), the camera-laser-unit being adapted to record a location, shape and/or dimensions of a measurement-object, the method comprising the steps of:

- a) selecting a calibration-object having at least two planes disposed at a given angle (β) with respect to each other, each plane having a given, non-coplanar calibration-pattern;
- b) disposing the calibration-object at a given position and orientation in three-dimensional space with respect to the camera-laser-unit, wherein an orientation of the calibration-object is such that light emitted by the laser is visible to the camera on the at least two planes of the calibration-object;
- c) ~~calibrating~~determining a location of the camera with respect to the calibration-object using a Tsai algorithm;
- d) calibrating the camera in three-dimensional space using the results of steps b) and c);
- ~~d) activating~~e) activating the laser to emit light visible on the at least two planes of the calibration-object;

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- ~~e) recording~~ f) recording the light on the two planes with the camera;
 - ~~f) determining~~ g) determining the laser-properties from the light recorded by the camera; and
 - ~~g) calibrating~~ h) determining a location of the laser relative to the camera; and
 - ~~according to the determined laser-properties;~~
 - i) calibrating the laser in three-dimensional space using the results of steps d) and h).
13. (previously presented) The method of claim 12, wherein step g) comprises the step of defining a relative position and orientation of the laser with respect to a coordinate frame associated with the calibration-object, wherein the coordinate frame has a given position and orientation in three-dimensional space.
14. (previously presented) The method of claim 12, wherein light emitted by the laser is visible on the two planes of the calibration-object as a line on each plane, the lines intersecting at a contact line of the two planes, wherein the laser-properties are determined from the lines recorded by the camera using a line detection algorithm.
15. (previously presented) The method of claim 12, wherein light emitted by the laser is visible on the two planes of the calibration-object as a line on each plane, the lines intersecting at a contact line of the two planes, wherein a laser-plane is defined by an optical axis of the laser and the lines visible on the two planes of the calibration-object, wherein, a position and orientation of the laser-plane with respect to a coordinate frame associated with the calibration-object is defined to calibrate the laser according to determined laser-properties.

16. (previously presented) The method of claim 12, wherein step c) comprises the step of defining a relative position and orientation of the camera with respect to a coordinate frame associated with the calibration-object, said coordinate frame having a given position and orientation in three-dimensional space.
17. (previously presented) The method of claim 12, further comprising defining a transformation matrix in dependence on a relative position and orientation of the camera with respect to a coordinate frame associated with the calibration-object, a relative position and orientation of the laser with respect to the coordinate frame, and/or on internal camera parameters.
18. (previously presented) The method of claim 12, further comprising grasping the camera-laser-unit with an industrial robot and disposing the unit relative to the calibration-object in a given position and orientation in three-dimensional space, wherein an orientation of the camera-laser-unit is such that light emitted by the laser is visible to the camera on the at least two planes of the calibration-object.
19. (cancelled)
20. (previously presented) The device of claim 24, wherein said angle between said two planes of the calibration-object is a right angle.
21. (previously presented) The device of claim 24, wherein features of said calibration-pattern are designed as recesses or as cavities having a circular cross section.

22. (previously presented) The device of claim 24, wherein features of said calibration-pattern comprise prints on said two planes.
23. (currently amended) A device for calibrating a camera-laser-unit with respect to at least one calibration-object disposed at a given position and orientation in three-dimensional space, the camera-laser-unit having at least one laser and at least one camera, wherein the laser and the camera are disposed at a given distance with respect to one another, and an optical axis of the laser and an optical axis of the camera subtend a given angle (α), the camera-laser-unit being adapted to record a location, shape and/or dimensions of a measurement-object, the device comprising:
- means for selecting a calibration-object having at least two planes disposed at a given angle (β) with respect to each other, each plane having a given, non-coplanar calibration-pattern;
 - means for disposing the calibration-object at a given position and orientation in three-dimensional space with respect to the camera-laser-unit, wherein an orientation of the calibration-object is such that light emitted by the laser is visible to the camera on the at least two planes of the calibration-object;
 - means for ~~calibrating~~determining a location of the camera with respect to the calibration-object using a Tsai algorithm;
 - means for calibrating the camera in three-dimensional space using results generated by the means for disposing the calibration object and by the means for determining a location of the camera with respect to the calibration-object;
 - means for activating the laser to emit light visible on the at least two planes of the calibration-object;
 - means for recording the light on the two planes with the camera;

means for determining the laser-properties from the light recorded by the camera; ~~and camera;~~

means for ~~calibrating~~determining a location of the laser relative to the camera according to the determined laser properties;
and

means for calibrating the laser in three-dimensional space using results generated by the means for calibrating the camera in three-dimensional space and the means for determining the location of the laser relative to the camera.

24. (currently amended) The device of ~~claim 24~~claim 23, wherein said non-coplanar calibration-pattern has an array of features, said calibration-object being structured and dimensioned for calibration of the camera as well as for calibration of the laser.